



Recent Tevatron Efforts

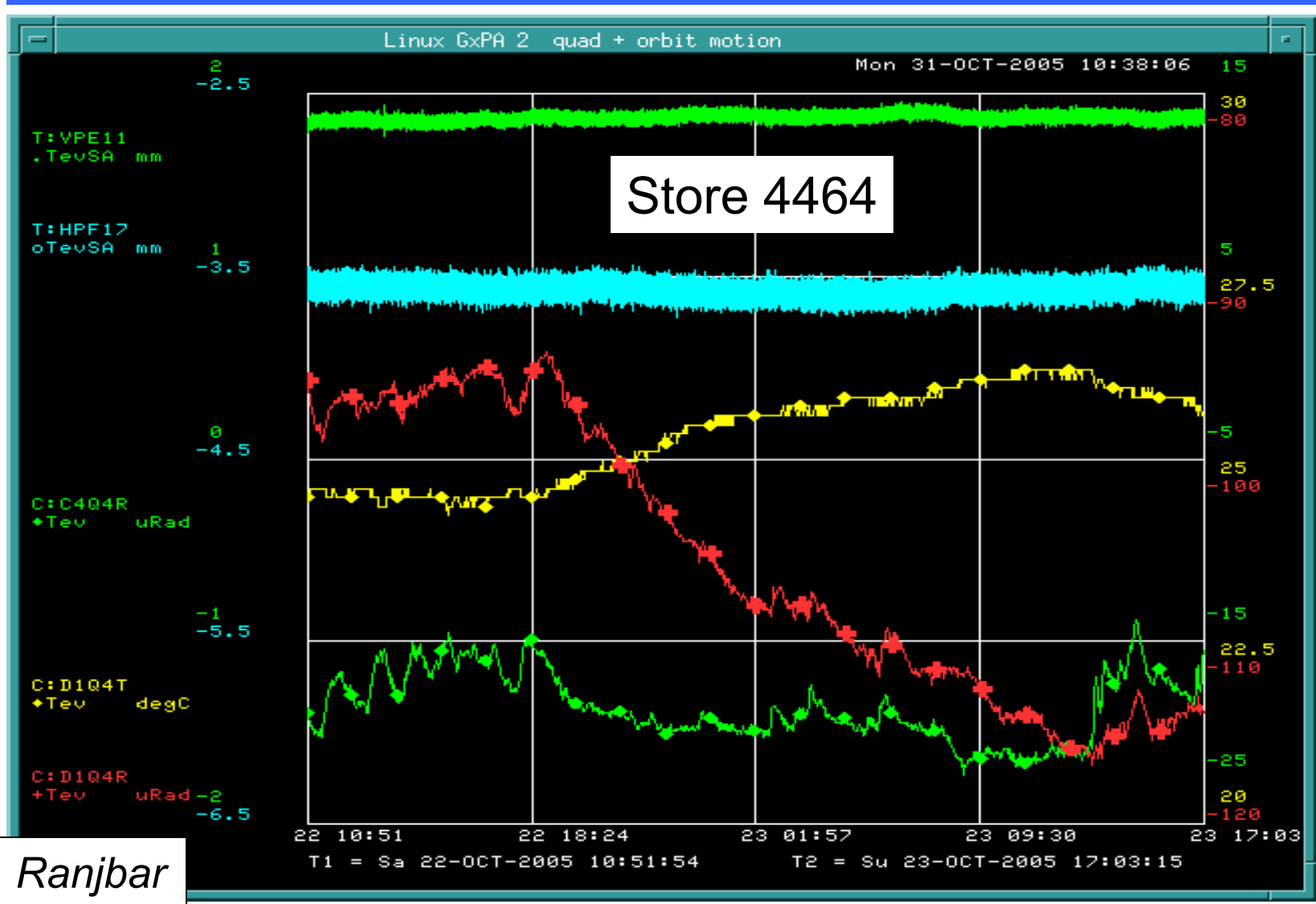
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- Orbit Stabilization
- Move Proton Tunes $> 7/12$ Resonance
- Fix CDF IP Waist
- Reduce D0 Losses at End of Squeeze



In-Store Orbit Stabilization: It's Operational!



V. Ranjbar

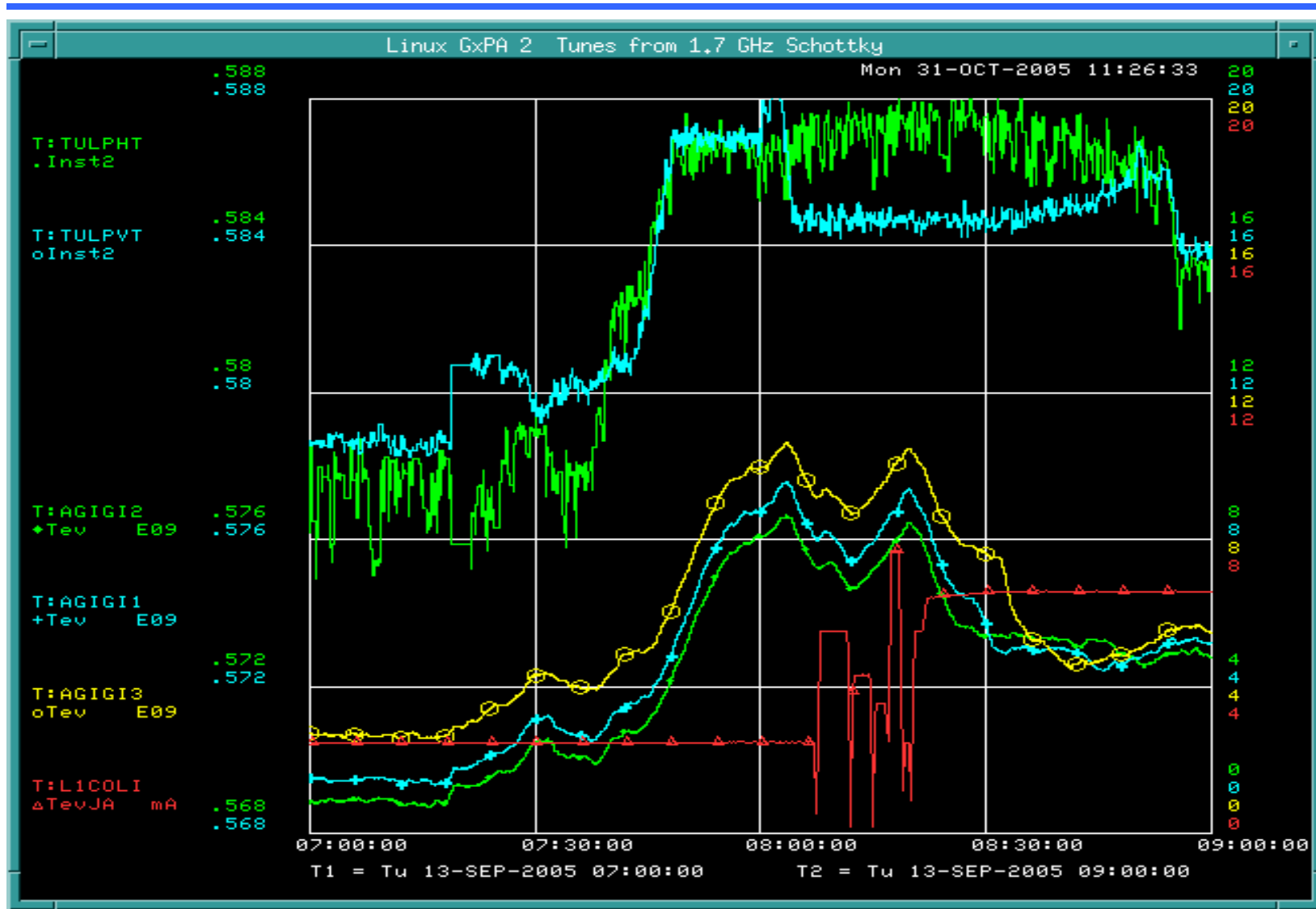


Move Proton Tunes > 7/12 Resonance

- Previously: $4/7$ (0.571) < proton tunes < $7/12$ (0.583)
- Mixed source pbars \Rightarrow large differences in brightness = N / ϵ
 - Head-on beam-beam tune shift varies with brightness
 - Some proton bunches tune-shifted up onto $7/12$ resonance
 - Lower lifetime, higher losses for those bunches
 - Helps with store-to-store differences
- Move protons above $7/12$ resonance to get more tune space
 - But keep pbar tunes fixed and keep ability to make changes
 - Not enough current in S4 feeddown circuits (our usual knob)
 - TEL abort gap cleaning would become less efficient
- S3 circuit + tune, coupling adjustments (*Yu. Alexahin, A. Valishev*)
 - Modelling, several beam studies



TEL Abort Gap Cleaning with Higher Proton Tunes





Move Proton Tunes $> 7/12$ Resonance

- TEL exploits nearby tune resonances for abort gap cleaning
 - Pulsing every 7 turns good for previous proton tunes near $4/7$
- Need new scheme for proton tunes $> 7/12$ (*X. Zhang*)
 - After studies and operational experience, now pulsing every 6 turns
- Higher proton tunes only in HEP now
 - Eventually propagate to injection, ramp, squeeze
 - Involves considerable study time...not on-the-fly between stores



Move CDF IP Waist

- Waist = longitudinal position of minimum β
 - Can be different for horz, vert β functions
- ≈ 5 cm offset @ CDF was a remnant of changing to 28 cm β^*
- Fix requires swapping loads of Q2 & Q3 low- β trims (*A. Valishev*)
 - Put trim current into upstream quad rather than downstream
 - Partial corrections by zeroing the current in those trims
 - Complicated since trims are used during ramp and/or squeeze
 - Make corrections in steps
- Q2 trim cable swapped, squeeze corrected, current > 0 for HEP
- Q3 trim now running at \approx zero for HEP
- Bulk of the correction is done (store 4473)...hopefully that's sufficient

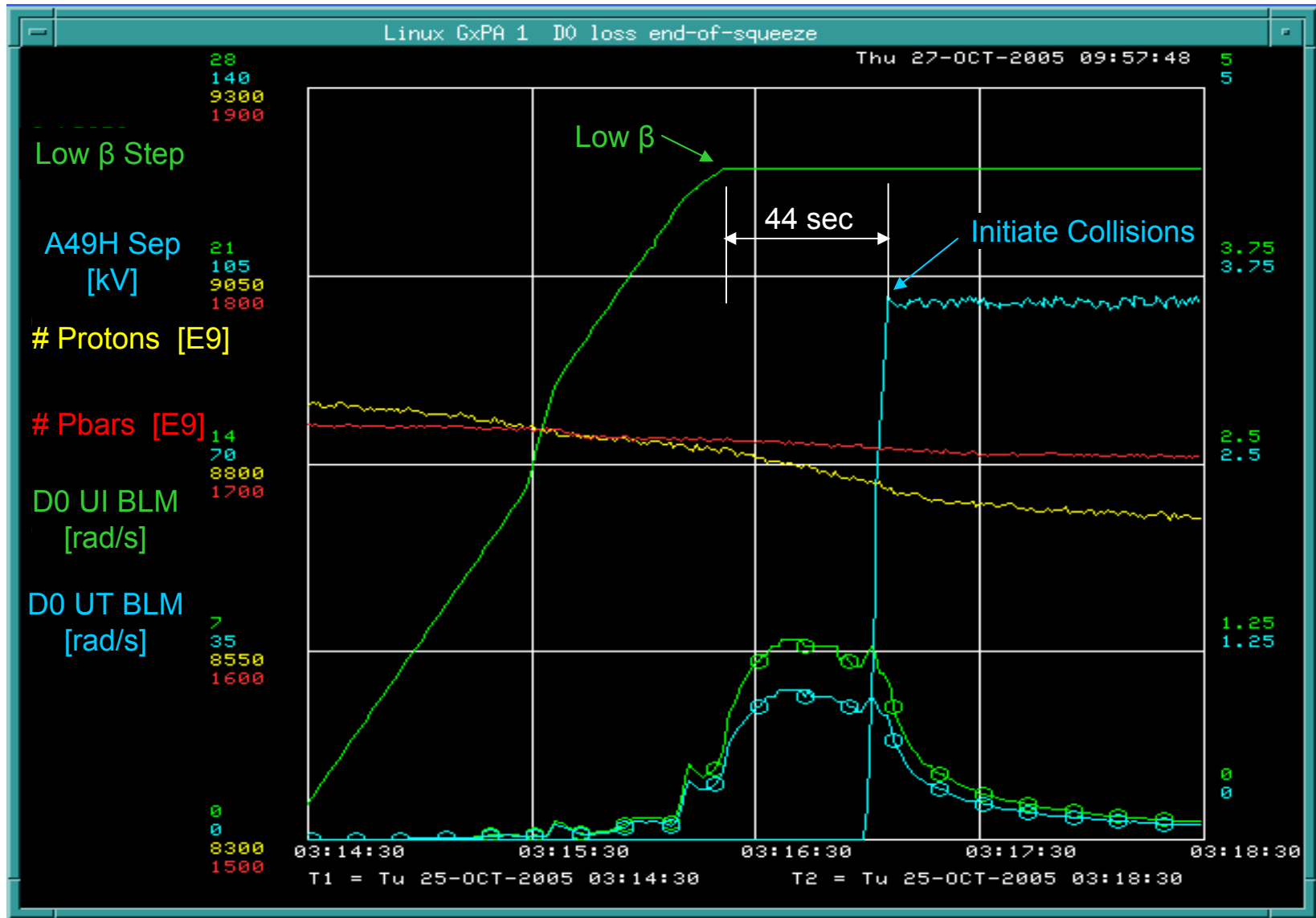


Reduce D0 Losses @ End of Squeeze

- For several months, D0 hit with losses near end of the squeeze
 - 30 – 100 rad/min
 - Occasionally damaged power supplies
- Source unclear...tried tuning, chromaticity reductions, verified orbits not hitting apertures
- Switching to 28 cm β^* seemed to help, but problems got worse



D0 Losses @ End of Squeeze: Store 4464





Reduce D0 Losses @ End of Squeeze

- Decrease amount of time between low β and initiating collisions
 - Attempt to reduce integrated dose during time of high losses
 - Automatically start collisions after reaching low β
 - Change to Tev sequencer → eliminate human intervention for that step
- Fix orbit mismatch between low β and collisions
 - Ideally, only differences should be near IPs
 - Separator ramps to remove beam offsets (horz @ CDF, vert @ D0)
 - However, significant differences in arcs and smaller than desired separation between protons and pbars
 - Correct separator settings at low β
- Both changes implemented for store 4473...much better!
 - Should also fix separators at step 24 (just before low β)



D0 Losses @ End of Squeeze: Store 4473

